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*On the Application of Liquids formed by the Condensation of Gases as Mechanical Agents.* By Sir Humphry Davy, Bart. P.R.S. Read April 17, 1823. [*Phil. Trans.* 1823, p. 199.]

The elasticity of vapours, in contact with the liquids from which they are produced under high pressures in high temperatures, is known to increase in a higher ratio than the arithmetical one of the temperature; but the exact law is not determined, and the loss of latent heat in compression, and the re-absorption in expansion, renders the advantage of steam under great pressure and at very high temperatures doubtful in an economical view. No such doubt, however, exists in regard to those fluids which require very great compression for their existence, and where common temperatures are sufficient to produce an immense elastic force. Thus sulphuretted hydrogen, which condenses into a liquid under a pressure of 14 atmospheres at  $3^{\circ}$ , had its elastic force increased so as to equal a pressure of 17 atmospheres by raising its temperature to  $47^{\circ}$ . Liquid muriatic acid at  $3^{\circ}$  exerted an elastic force equal to the pressure of 20 atmospheres, at  $25^{\circ} = 25$  atmospheres, and at  $51^{\circ} = 45$  atmospheres.

After some experimental illustrations of the expansibility of the vapour of sulphuret of carbon at different temperatures, the author adverts to the possible application of the difficultly compressible gases, as mechanical agents, and to their power of producing cold by the rapidity of their evaporation.

*On the Temperature at considerable Depths of the Caribbean Sea.* By Captain Edward Sabine, F.R.S. In a Letter addressed to Sir Humphry Davy, Bart. P.R.S. Read April 17, 1823. [*Phil. Trans.* 1823, p. 206.]

In this letter Captain Sabine details the results of some experiments on the temperature of the Caribbean Sea, in lat.  $20\frac{1}{2}^{\circ}$  N. and long.  $83\frac{1}{2}^{\circ}$  W. At the depth of 1230 fathoms by the line, or about 1000 fathoms actual depth, a six's register thermometer indicated  $45^{\circ}\cdot 5$ , the temperature of the water at the surface varying from  $82^{\circ}\cdot 5$  to  $83^{\circ}\cdot 2$ , so that the difference amounted to  $37^{\circ}\cdot 3$ .

*Letter from Captain Basil Hall, R.N. to Captain Kater, communicating the Details of Experiments made by him and Mr. Henry Foster, with an Invariable Pendulum, in London; at the Galapagos Islands in the Pacific Ocean, near the Equator; at San Blas de California on the N.W. Coast of Mexico; and at Rio de Janeiro in Brazil. With an Appendix, containing the Second Series of Experiments in London, on the Return.* Read April 24, 1823. [*Phil. Trans.* 1823, p. 211.]

Captain Hall stated that the ship which he commanded had been constantly employed on a particular description of service, having no reference to such inquiries, but which occupied nearly all his time.